

AMENDMENTS TO THE CLAIMS

1. (Previously presented) A sub-atmospheric downstream pressure control apparatus, characterized by:
 - a first flow restricting element (FRE), wherein said first FRE is an immobile flow restricting element;
 - a pressure control chamber (PCC) located in serial fluidic communication downstream from said first FRE;
 - a second FRE located in serial fluidic communication downstream from said PCC, wherein said second FRE is an immobile flow restricting element;
 - a gas source; and
 - a flow controlling device in serial fluidic communication downstream from said gas source and upstream from said PCC.

2. (Previously presented) A sub-atmospheric downstream pressure control apparatus as in claim 1 further characterized by:
 - a reactive gas source connected in serial fluidic communication upstream from said PCC;and
 - an abatement element located within said PCC.

3. (Previously presented) A sub-atmospheric downstream pressure control apparatus as in claim 1 further characterized by:
 - a third FRE connected in serial fluidic communication downstream from said PCC;
 - an abatement chamber connected in serial fluidic communication upstream from said third FRE;
 - a reactive gas source connected in serial fluidic communication upstream from said abatement chamber; and
 - an abatement element disposed within said abatement chamber.

4. (Previously presented) A sub-atmospheric downstream pressure control apparatus as in claim 1 wherein a process chamber is located in serial fluidic communication upstream from said first FRE;

said process chamber and said PCC are formed as compartments within a single process vessel; and

said first FRE is formed within the partition between said process chamber and said PCC.

5. (Previously presented) A wafer processing apparatus comprising a process chamber, said apparatus characterized by:

a process reactive gas supply line from a process gas source in serial fluidic communication upstream from said process chamber;

an upstream flow control device located in serial fluidic communication upstream from said process chamber and downstream from said process gas source;

a first flow restricting element located in serial fluidic communication downstream from said process chamber, wherein said first FRE is an immobile flow restricting element;

a pressure control chamber (PCC) located in serial fluidic communication downstream from said first FRE;

a second FRE located in serial fluidic communication downstream from said PCC, wherein said second FRE is an immobile flow restricting element;

a gas source; and

a flow controlling device in serial fluidic communication downstream from said gas source and upstream from said PCC.

6. (Previously presented) A sub-atmospheric downstream pressure control apparatus as in claim 5 further characterized by:

a reactive gas source connected in serial fluidic communication upstream from said PCC; and

an abatement element located within said PCC.

7. (Previously presented) A sub-atmospheric downstream pressure control apparatus as in claim 5 further characterized by:
a third FRE connected in serial fluidic communication downstream from said PCC;
an abatement chamber connected in serial fluidic communication upstream from said third FRE;
a reactive gas source connected in serial fluidic communication upstream from said abatement chamber; and
an abatement element located within said abatement chamber.

8. (Previously presented) A sub-atmospheric downstream pressure control apparatus as in claim 5 wherein a process chamber is located in serial fluidic communication upstream from said first FRE;
said process chamber and said PCC are formed as compartments within a single process vessel; and
said first FRE is formed within the partition between said process chamber and said PCC.

9. (Original) A sub-atmospheric downstream pressure control apparatus as in claim 5 wherein said process is LPCVD.

10. (Original) A sub-atmospheric downstream pressure control apparatus as in claim 5 wherein said process is RIE.

11. (Original) A sub-atmospheric downstream pressure control apparatus as in claim 5 wherein said process is PECVD.

12. (Withdrawn) A downstream pressure control method, comprising controlling a flow of process gas into a process chamber; said method characterized by further comprising:
providing a flow of gas into a pressure control chamber (PCC) connected in serial fluidic communication downstream from said process chamber;

controlling fluid flow with a first flow restricting element (FRE) located in serial fluidic communication downstream from said process chamber and upstream from said PCC; and

controlling the pressure at said process chamber by adjusting the pressure in said PCC to impact the pressure gradient over said first flow restricting element.

13. (Withdrawn) A method for sub-atmospheric reactive gas abatement, characterized by further comprising:

providing a substantial pressure gradient at an inlet to an abatement space;

providing a substantial pressure gradient at an outlet from said abatement space;

flowing a reactive abatement gas into said abatement space;

reacting with process gas exhaust effluents to produce substantially stable and inert solid;

and

substantially localizing said substantially stable and inert solid within said abatement chamber.

14. (Withdrawn) A method for sub-atmospheric reactive gas abatement of process gas exhaust effluent, said method characterized by further comprising:

providing a substantial pressure gradient at an inlet to an abatement space;

providing a substantial pressure gradient at an outlet from said abatement space;

flowing a reactive abatement gas into said abatement space;

reacting said reactive abatement gas with said process gas exhaust effluent to produce a substantially volatile effluent gas; and

transporting said substantially volatile effluent gas through a pump foreline and pump substantially without further reaction and substantially without growth of film deposits.

15. (Withdrawn) A wall-protected process chamber (710, 730), comprising:
an external enclosure (602);

a gas permeable internal enclosure (604) disposed within said external metallic enclosure and enclosing said process chamber;

a seal (608, 610) between said internal enclosure and said external metallic enclosure, said internal enclosure and said external enclosure defining a substantially sealed space (606) between the outer wall of said internal enclosure and the inner wall of said external metallic enclosure; and

a source (612) of a pressurized inert gas in fluid communication with said sealed space; whereby said pressurized inert gas flows through said gas permeable internal enclosure to protect said process chamber wall.

16. (Previously presented) A sub-atmospheric downstream pressure control apparatus comprising:

(a) a first flow restricting element (FRE), wherein said first FRE is an immobile flow restricting element;

(b) a pressure control chamber (PCC) located in serial fluidic communication downstream from said first FRE;

(c) a second FRE located in serial fluidic communication downstream from said PCC, wherein said second FRE is an immobile flow restricting element;

(d) a gas source (208);

(e) a flow controlling device in serial fluidic communication downstream from said gas source and upstream from said PCC;

(f) a reactive gas source connected in serial fluidic communication upstream from said PCC; and

(g) an abatement element located within said PCC.